King Abdullah University of Science and Technology
at Thuwal, Kingdom of Saudi Arabia

جامعة الملك عبدالله للعلوم والتقنية
ثول ، المملكة العربية السعودية

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Message from President Choon Fong Shih

ON BEHALF of our KAUST community, I would like to extend a special welcome to the families of our graduating students. Welcome to our beautiful campus by the Red Sea. We look forward to your participation in our 2012 Commencement Ceremony and related activities.

Commencement is a significant milestone event in our University's academic life. It is a time for us – families, students, faculty, and staff – to celebrate our graduates' accomplishments and send them off on the next phase of their life journeys.

Dear families and friends, please enjoy your time at KAUST getting to know our people and life here.

Choon Fong Shih
KAUST President

For any information regarding Commencement activities, please contact the team at commencement@kaust.edu.sa, or drop by the information booth located at the Student Center (Building 18) from 9:00 a.m.-5:00 p.m. weekdays.

رسالة من رئيس الجامعة البروفيسور تشون فونغ شيه

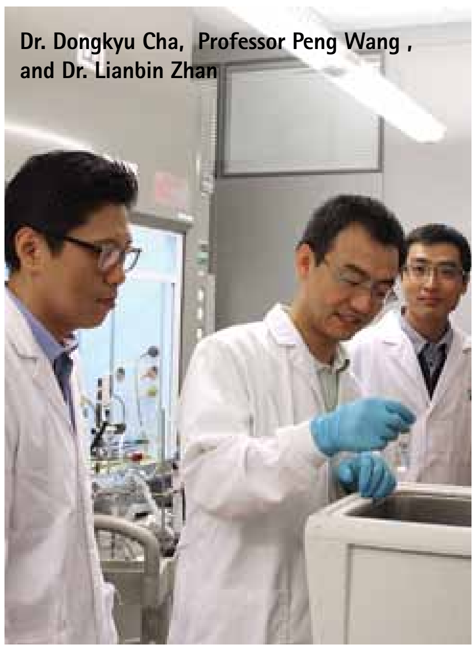
يسرني أن أعرب لكم نيابة عن مجتمع جامعة الملك عبدالله للعلوم والتقنية بترحيبنا الحار لعائلات الطلاب الخريجين. فمرحبا بكم في حرمنا الجامعي الجميل على ساحل البحر الأحمر، ونتطلع إلى مشاركتكم لنا في احتفالنا بتخريج دفعة 2012 وفي الفعاليات المصاحبة لهذا الحفل.

ويمثل حفل التخرج في حياة جامعتنا علامة ومناسبة فارقة، وهو وقت لنا وللعائلات والطلاب وهيئة التدريس للاحتفاء بإنجازات الخريجين وانطلاقهم للمضي في المرحلة التالية من رحلة حياتهم.

نأمل أن تستمتع العائلات وكذلك الأصدقاء بوقتهم في جامعة الملك عبدالله للعلوم والتقنية والتعرف على الناس والحياة هنا في الجامعة.

تشون فونغ شيه
رئيس جامعة الملك عبدالله للعلوم والتقنية

للحصول على المزيد من المعلومات عن فعاليات التخرج، نرجو الاتصال بالفريق على البريد الالكتروني commencement@kaust.edu.sa أو زيارة مكتب المعلومات في مركز الطلبة (المبنى رقم 18) بين التاسعة صباحا والخامسة مساء أثناء أيام العمل.



Dr. Dongkyu Cha, Professor Peng Wang , and Dr. Lianbin Zhan

كرات زجاجية صغيرة يتم التحكم فيها عن بعد

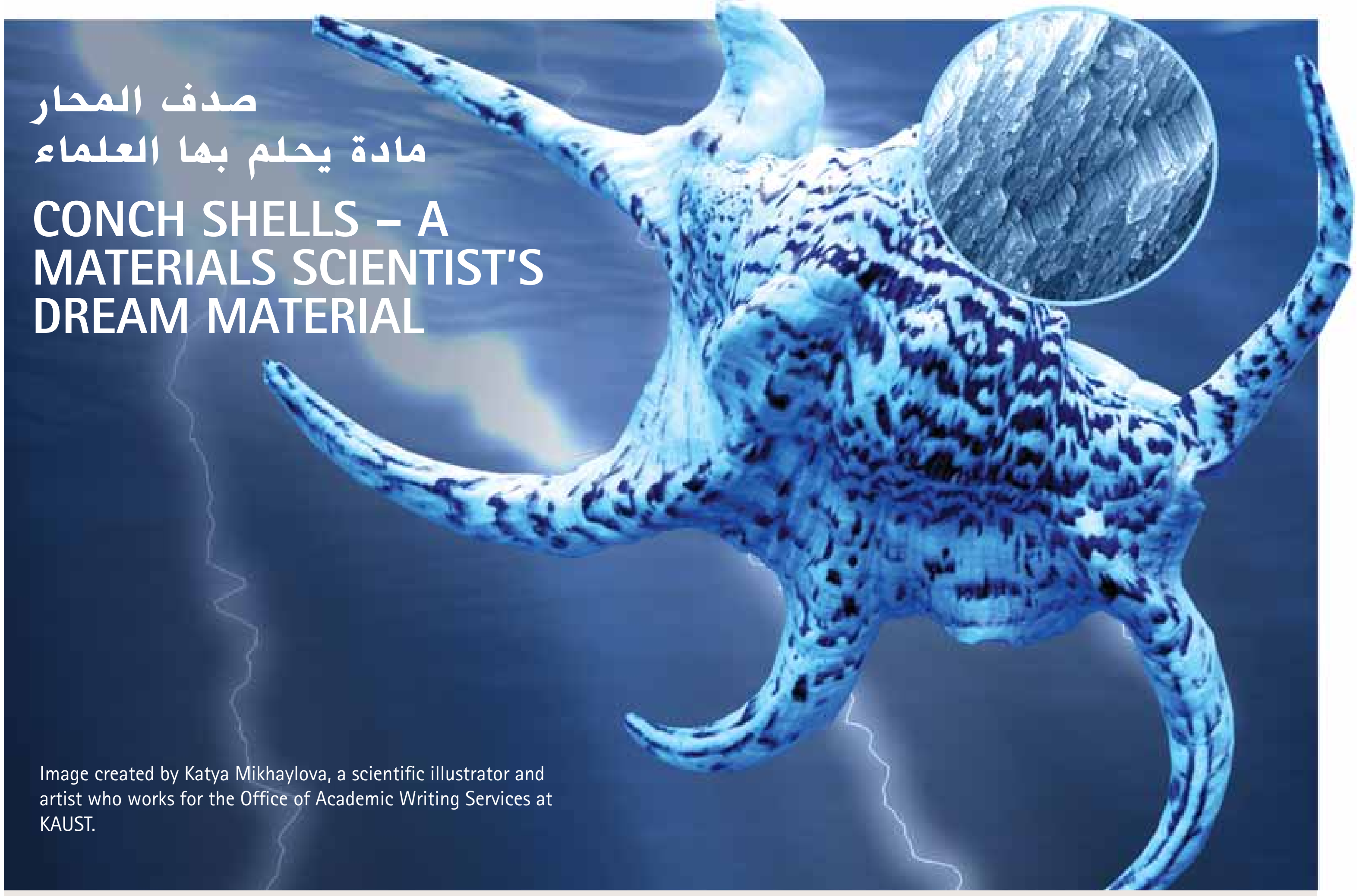
تعاون الدكتور بينغ وانغ، الأستاذ المساعد في هندسة وعلوم البيئة وليانبين زانغ، زميل ما بعد درجة الدكتوراه، مع الدكتور دونغكيو تشا من المختبر المركزي للتصنيع والتوصيف المتقدم بتقنية النانو في جامعة الملك عبدالله بهدف تطوير كرات رخام سائل يتم التحكم فيها عن بعد. وقد نشر الورقة العلمية في مطبوعة Advanced Materials، كما أبرزتها مطبوعتا Discovery News و Nature Middle East.

تتمه صفحة 2

REMOTELY CONTROLLABLE LIQUID MARBLES

DR. PENG Wang, Assistant Professor of Environmental Sciences and Engineering, and postdoctoral fellow Lianbin Zhang, have collaborated with Dr. Dongkyu Cha from the KAUST Advanced Nanofabrication and Characterization Core Lab to develop remotely controllable liquid marbles. The research paper was published in *Advanced Materials*, and highlighted by *Discovery News* and *Nature Middle East*.

LIQUID MARBLES | *Continued on p2*



صدف المحار مادة يحلم بها العلماء

CONCH SHELLS – A MATERIALS SCIENTIST'S DREAM MATERIAL

Image created by Katya Mikhaylova, a scientific illustrator and artist who works for the Office of Academic Writing Services at KAUST.

ALBERT Einstein said, "Look deep into nature, and then you will understand everything better."

When Dr. Xixiang Zhang, Director of KAUST Core Labs and Major Facilities, bought a conch shell in a Chinese market, he little knew that years later he would be cutting it into slices to examine its intricate nanoscale architecture.

"The shell that protects spineless mollusks is an extraordinary material. It's made mostly of calcium carbonate, the same material as crumbly chalk, but unlike chalk, this shell is strong and tough," Dr. Zhang said. "As such, it has long been the target of investigations into its mechanical properties."

Dr. Zhang and his colleagues used electron microscopy to confirm the shell's nanoarchitecture. They cut the shell into thin slices and saw how the crystalline calcium carbonate layers are stacked – each layer with its laminae at a right angle to the previous layer, held together with a biopolymer that acts like a glue. However, it was

CONCH SHELLS | *Continued on p2*

قال البرت أينشتاين "تمعنوا بعمق في الطبيعة وعندها ستفهمون كل شيء بصورة أفضل"

عندما قام الدكتور زيانغ زانغ مدير المختبرات المركزية والمرافق الأساسية في جامعة الملك عبدالله للعلوم والتقنية بشراء صدفة محار من أحد الأسواق الصينية لم يكن يدرك كثيرا أنه بعد عدة سنوات سيقوم بتقطيعها إلى شرائح لفحص تكوينها المعقد بمقياس النانو.

ويقول الدكتورزيانغ أن القشرة التي توفر الحماية للرخويات اللافقارية هي عبارة عن مادة استثنائية مصنوعة في الغالب من كربونات الكالسيوم وهي نفس مادة الطبشور المفتت ولكنها على خلاف الطبشور تتميز بالمتانة والقوة ولذلك السبب ظلت منذ مدة طويلة هدفا للدراسات والتقصي لمعرفة خصائصها الميكانيكية.

وقد استخدم الدكتور زيانغ وزملاؤه أساليب التصوير بالمجهر الإلكتروني لفحص التكوين المعقد والدقيق للصدفة حيث قاموا بتشريحها إلى شرائح رقيقة ومشاهدة الكيفية التي تتراكم بها طبقات كربونات الكالسيوم البلورية وحيث تكون كل طبقة مع صحيفتها الرقيقة على زاوية قائمة مع الطبقات السابقة لها ومتماسكة مع بعضها الآخر بوجود بوليمر بيولوجي يعمل كمادة لاصقة. ولكن

تتمه صفحة 2

INSIDE: ● News 1–3 ● Winter Enrichment Program 4–5 ● Supercomputing 6–7 ● Community 8

CONGRATULATIONS CLASS OF 2012!

On the journey of growing a new university on the shores of the Red Sea, our short history has been marked by many ‘firsts’. This month we recognize our third graduating class at the 2012 Commencement Ceremony, and with it celebrate another noteworthy first: our inaugural PhD graduates.

To both PhD and MS graduates of the Class of 2012, The Beacon offers heart-felt congratulations on this important occasion. We share in your excitement and hope that you will continue to think big, to foster your curiosity, and to push the boundaries of knowledge.

We offer an Arabic proverb as encouragement in your continued drive to discover:

If you reach for the highest of ideals,
you shouldn’t settle for less than the stars

The Beacon, Volume 3, Issue 4, December 2012. Published by The Communications Department, **King Abdullah University of Science and Technology**, Thuwal 23955-6900, Saudi Arabia. Contact Salah Sindi *salah.sindi@kaust.edu.sa*, or Michelle D'Antoni *michelle.dantoni@kaust.edu.sa.* © King Abdullah University of Science and Technology. Printed on partially recycled paper.

CONCH SHELLS | Continued from p1

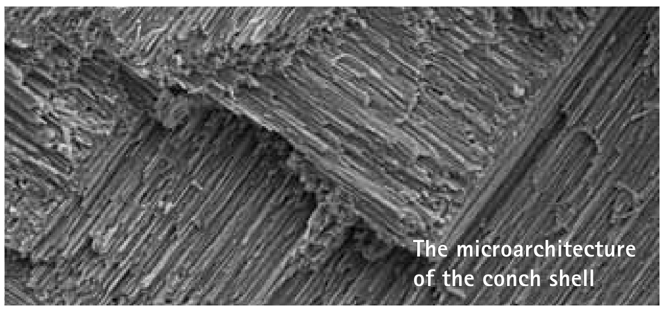
not the mechanical properties on which Dr. Zhang and his colleagues focused in their research; instead, they examined the material’s electric properties.

When the researchers measured the samples’ ferroelectric properties, they discovered that the unique sandwich-like nanostructure exhibits behavior that differs significantly from those of single-crystal slices. “The most striking difference between the shell and standard ferroelectret and ferroelectric materials is the huge remanent polarization which has direct implications on how the material is able to store energy,” said Dr. Zhang. “We found that the remanent polarization is more than 20 times larger than that in conventional ferroelectric materials and 2 to 4 orders of magnitude larger than that in ferroelectret foams and other electrets.” Put simply, the capacity for conch shell material to store energy is much higher than that reported for any man-made ferroelectric material or in electrets. “What nature has contrived in this shell’s structure is a material that scientists only dream of synthesizing,” said Dr. Zhang.

The novel discovery by Dr. Zhang and his colleagues could lead to the development of nanocomposites with high electric polarization for high-performance sensors or capacitors for high-density energy storage.

An online version of the *Advanced Materials* paper, “Bio-Assembled Nanocomposites in Conch Shells Exhibit Giant Electret Hysteresis,” was published ahead of print. http://dx.doi.org/10.1002/adma.201202079 ☐

تابع ص1 | صدف المحار


The microarchitecture of the conch shell

لم يكن تركيز الدكتور زيانغ وفريقه في أبحاثهم على الخواص الميكانيكية بل على فحص ومعرفة الخصائص الكهربائية للمادة.

وقد اكتشف الباحثون عند قيامهم بقياس الخواص الكهربائية المعدنية للعينات أن سلوك البنية الفريدة متناهية الصغر التي تشبه (الساندويتش) تختلف عن بنية الشرائح البلورية المفردة. واللافت للنظر كما يقول الدكتورزيانغ أن الفرق بين الصدفة والمواد الكهربائية المعدنية يتمثل في الاستقطاب الضخم المتبقي وما له من مضامين مباشرة على الطريقة التي تقوم بها المادة بتخزين الطاقة، ويستطرد قائلا أنهم اكتشفوا أن الاستقطاب المتبقي أكبر بما يتجاوز 20 ضعف من الاستقطاب في المواد الكهربائية المعدنية التقليدية. وبإختصار وبساطة وجدوا أن قدرة مادة صدف المحار على تخزين الطاقة أعلى بكثير من أية مادة كهربائية معدنية من صنع الانسان مختتما حديثه بالقول بأن بنية الصدفة تُعد تشكيل مادة توليف يحلم بها العلماء.

وقد يؤدي هذا الاكتشاف المبتكر من قبل الدكتورزيانغ وفريقه إلى تطوير مركبات متناهية الصغر ذات استقطاب كهربائي عال لأجهزة الاحساس عالية الأداء أو المكثفات ذات قدرات تخزين طاقة عالية الكثافة.

وقد تم نشر ورقة عمل عن المواد المتقدمة على شبكة الانترنت عبر الرابط التالي :

http://dx.doi.org/10.1002/adma.201202079 وسيتم نشرها على غلاف المطبوعة الورقية. ☐

LIQUID MARBLES | Continued from p1

For the past ten years, researchers have been developing liquid marbles: water droplets coated with a layer of water-repellent particles. They can be used for miniaturized biological and chemical processes, which offer many advantages over those done on a large scale – such as a reduced need of reagents, precisely controlled reaction parameters, and a shortened reaction duration.

Researchers have been able to develop methods to coat liquid drops, and to control the marble movement, but Professor Wang’s team has gone a step further. They developed liquid marbles that can be controlled remotely – their movement can be controlled with a magnetic field, and the coating opened with ultraviolet light.

“Our liquid marble coating is made of tiny grains, novel core/shell-structured stimuli-responsive magnetic particles (RMPs). The grains have a core made out of magnetite, which makes them magnetic. The core is protected with a dense layer of nonporous silica. They are then coated with another layer of silica, but this layer has tiny pores in it,” Prof. Wang explained.

The resulting grains are highly hydrophobic – water repellent – so once the grains have been prepared, it’s easy to prepare the liquid marbles. “We simply roll water droplets on a pile of RMP grains, and the liquid marbles assemble spontaneously,” Prof. Wang said.

“We can move the marbles remotely because our grains have a magnetic core. The reason we can open the marbles remotely is that we have altered the grains’ outer silica coating. When we prepare the grains, we graft the coating’s surface with responsive block copolymers, and we load the tiny silica pores with photo-acid generators. When we shine the marbles with ultraviolet light, the light causes the photo-acid generators to generate acid. This starts a cascade of reactions that leads to hydrophilic transition of the grain shells and the rupture of the marbles.”

Professor Wang envisions that their liquid marbles can be used for smart delivery of water-soluble actives to initiate chemical reactions on demand, and for channel-free microfluidic systems and sensors with visual indicating capability. ”Remotely Controllable Liquid Marbles” http://dx.doi.org/10.1002/adma.201201885 was published in *Advanced Materials* in September ☐

تابع ص1 | الكرات الزجاجية السائلة

وقد ظل الباحثون طوال السنوات العشر الماضية يعملون على تطوير كرات رخام سائل: أي قطرات من الماء مغلفة بطبقة من الجزئيات الطاردة للماء، وهذه الكرات الرخامية ضرورية للعمليات البيولوجية والكيميائية المصغرة التي توفر العديد من المزايا التي تتفوق على مزايا التجارب التي تجرى على الكميات الكبيرة، بما في ذلك خفض الحاجة إلى الكواشف وأسس التفاعل التي يتم التحكم فيها بصورة كاملة وقصر مدة التفاعل.

وقد تمكن الباحثون من تطوير طرق لتغليف قطرات السوائل والتحكم في حركة كرات الرخام، غير أن فريق البروفسور بينغ وانغ ذهب إلى أبعد من ذلك حيث قام بتطوير كرات من الرخام السائل يمكن التحكم فيها عن بعد، أي التحكم في حركتها في مجال مغناطيسي وفتح التغليف بتسليط الإضاءة فوق البنفسجية.

ويشرح البروفسور وانغ ذلك بقوله أن تغليف كرات الرخام السائل يتم بإستخدام حبيبات صغيرة وهي عبارة عن جزيئات مغناطيسية مبتكرة على شكل صدفة تستجيب للتنشيط. ونواة هذه الحبيبات مصنوعة من أوكسيد الحديد الأسود (الماغنتيت)، الذي يضفي عليها صفة وخواص المغناطيس. وتتم حماية النواة بطبقة كثيفة من مادة السليكا غير المسامية، ومن ثم تغلف بطبقة أخرى من السليكا ولكن بمسامات صغيرة.

وتتميز الحبيبات الناتجة بأنها طاردة للماء بشدة ولذلك وحالما يتم تجهيز الحبيبات فإن تحضير كرات الرخام يصبح سهلا حيث يتم دحرجة نقاط الماء على كوم من الحبيبات المجهزة وبذلك تتجمع مواد الرخام السائل بصورة تلقائية وعفوية.

ويستطرد البروفسور وانغ في شرحه قائلا أنهم يستطيعون تحريك كرات الرخام عن بعد لأن الحبيبات تحتوي على نواة مغناطيسية والسبب في تمكنهم من فتح كرات الرخام عن بعد هو بسبب الابدال بغلاف السليكا الخارجي للحبيبات. ويقول أنهم عند القيام بتحضير الحبيبات يلجؤون إلى كشط سطح التغليف بمكعبات من مزيج البوليمر وتحميل مسامات السليكا بمولدات ضوء حمضية. وعند إضاءة كرات الرخام بضوء فوق بنفسجي يؤدي الضوء إلى جعل المولدات الضوئية الحمضية تنتج الحامض. وينتج عن ذلك سلسلة من التفاعلات ينتج عنها بدورها انتقال خاصية طرد الماء في غلاف الحبيبات وتصدع المواد الرخامية.

ويتصور البروفسور وانغ امكانية استخدام كرات الرخام السائل لتوصيل المضيفات الذائبة في الماء بطريقة ذكية من أجل إطلاق التفاعلات الكيميائية حسب الطلب وكذلك في نظم السوائل الدقيقة وأجهزة الاحساس مع توفير خاصية المؤشرات البصرية.

ENTREPRENEURSHIP CENTER STARTUP SHOWCASES VIE FOR AWARDS

NINE fall 2012 VentureLab teams presented their start-up businesses in a final showcase event November 18 in the Engineering Building Lecture Hall before a panel of prominent judges. Cash prizes were awarded to the top two teams, and the top three were shortlisted as Seed Fund finalists.

The participants met for nine weeks in the VentureLab. The first week, Dr. Steven Gold, director of the entrepreneurship program at Babson College, lectured on specific knowledge domains with a holistic approach to entrepreneurship. Over the next eight weeks the group met with Ahmed Abdulwahab, KAUST Entrepreneurship Manager, to learn how to turn a business idea into a startup. This action-oriented program focused on how to set up a business, create a business plan, contact investors, and make financial projections, or, in other words, how to become an entrepreneur.

The distinguished judges were: Rashid Al Ballaa, founder and CEO of N2V, one of the largest Internet holding company in the MENA region; Osama Natto, a serial entrepreneur and angel investor committed to

Continued on p3

عروض بدايات الأعمال في مركز الأعمال المبتكرة

مئات الآلاف وتعليم وبيانات تغذية وتواصل رياضي وتطبيقات للمسافرين

استعرضت 9 فرق من مختبر الأعمال المبتكرة بدايات أعمالهم في فعالية استعراض المشاريع التي جرى تنظيمها في 18 نوفمبر الماضي في صالة المحاضرات في مبنى الهندسة أمام هيئة من الحكام المبرزين. ومنحت جوائز نقدية لفريقين في المركزين الأولين وتم عمل قائمة قصيرة كمنافسين نهائيين للحصول على جوائز تمويل صندوق البذور. وفي الأسبوع الأول للبرنامج قدم الدكتور ستيفن جولد، مدير برنامج المشاريع المبتكرة في كلية بابسون، محاضرة عن مجالات المعرفة المحددة للأسلوب الشامل في تنشيط الأعمال المبتكرة. وعلى مدى الأسابيع الثمانية التالية اجتمعت المجموعة بين الساعة الرابعة والساعة التاسعة مساء كل يوم أحد مع أحمد عبدالوهاب مدير المشاريع المبكرة في جامعة الملك عبدالله للعلوم والتقنية لمعرفة كيفية تحويل أفكار الأعمال إلى شركات جديدة. وقد ركز البرنامج على كيفية إنشاء شركات جديدة وصياغة خطة العمل والتواصل مع المستثمرين وعمل التوقعات المالية أو بعبارة أخرى شرح الكيفية التي يمكن من خلالها أن تصبح صاحب أعمال مبتكرة.

وقد تألفت هيئة التحكيم المميزة من: راشد البلاع، المؤسس وكبير الإداريين التنفيذيين لشركة المبادرات الوطنية، وهي واحدة من أضخم شركات الإنترنت القابضة في منطقة الشرق الأوسط وشمال أفريقيا، وأسامة ناتو، وهو مستثمر مبتكر ملتزم بمساعدة

تتمه صفحة 3

Winners of the VentureLab Showcase: From left to right: Anas Dahlawi, Babson Award; Dr. Salman Al-Shobaki, Chief Learning Officer of Aramex, sponsor of the first place award with winners Rima Al-Kurdi and Luis Lopez; and second place winner Wail Yar with Mulhim Albakree, General Manager of the Alturki Group, sponsor of the award.

helping young Saudis create tech companies; Dr. Salman Al-Shobaki, the Chief Learning Officer at Aramex; Dr. Atieh Abu-Raqabah, General Manager of the SABIC Corporate Research and Innovation Center at KAUST; Professor Jean Frechet, KAUST Vice President of Research; Professor Yves Gnanou, KAUST Dean of Physical Sciences and Engineering; and Tristan Walker, KAUST Director of Budget Management.

The teams were given only six minutes to present their start-up businesses and a further two minutes to answer judges' questions and for judges to provide feedback to the entrepreneurs. The judges considered the general assessment of each proposal as well as product and market positioning, business competitiveness, the business model, and presentation preparation.

The first place winner was *Jana*, an online Arabic literacy tool targeted at young children, bringing best practices in education to the Arabic Language. Team members Rima Al-Kurdi and Luis Lopez, both KAUST teachers, received a check for 112,500 SR (in cash and kind) sponsored by the Aramex Group.

Second place went to *Calories*, an online Arabic nutrition database with a wealth of nutritional information, including traditional Arabic foods that are missing from current platforms. Team members Wail Yar and Ahmed Aljabreen (KAUST IT) were awarded 50,000 SR, sponsored by the Al Turki Group.

Both teams were short-listed as finalists to the Seed Fund Program with the opportunity to receive funding up to $200,000 to commercialize their idea. Also short-listed as a finalist to the Seed Fund competition was third place winner, *smARea*, a virtual reality technology for Islamic attractions in the holy cities of Makkah and Madinah. Team members are Abdulwahid Al-Zaydi and Mohammed Al-Zaydi, non-KAUST participants.

Anas Dahlawi (KAUST Procurement), a member of the *Haweee.com* team, a sports communication enterprise to bridge communication gaps between teams and sports facilities, received the Babson Award for his hard work, dedication, and improvement during the course. The award allows him to join Babson College for their summer entrepreneurship program in 2013.

In addition to these three showcase winners, two additional VentureLab teams, *Keep in Touch* and *SIRO*, were among the ten shortlisted in the ArabNet Riyadh 2012 competition. The best Ideathon startups in the region competed in ArabNet, the largest digital media and entrepreneurship platform in the MENA region.

Keep in Touch is an Arabic-to-sign language translation engine to eliminate the barriers between those with impaired hearing and the Arab-speaking world. Team members are Latefa Al-Sanie and Reem Turki (KAUST IT). *SIRO* is a travelers' app for the holy cities of Makkah and Madinah. It allows users to reserve hotels utilizing 3-D maps. Team members are Ahmad Showail (KAUST PhD student, CEMSE), Hammad Cheema (KAUST postdoc, PSE), and Saeed Al-Ansari.

At the end of the competition, *Keep in Touch* won Arabnet's First Place Award and was also named the People's Choice. ☐

الشباب السعودي بهدف تأسيس شركات التقنية التابعة لهم، والدكتور سلمان الشوبكي، كبير مسئولي التعليم في شركات أرامكس والدكتور عطية أبو رقبة، مدير عام مركز الأبحاث والابتكار في شركة سابك الكائن في جامعة الملك عبدالله، والبروفسور جان فريشيه، نائب رئيس الجامعة للأبحاث وإيف نانو، مدير علوم وهندسة الفيزياء في الجامعة، وتريستان ووكر، مدير إدارة الميزانية في جامعة الملك عبدالله.

وقد أعطيت الفرق ست دقائق فقط لاستعراض مشاريع بدايات الأعمال ودقيقتين إضافيتان للحكام لتوجيه الأسئلة وتقديم تعليقاتهم على المشروع للمبتكرين.

وقد أخذ الحكام بعين الاعتبار التقييم العام لكل اقتراح وكذلك المنتج وموقف تسويقه والمنافسة التجارية ونموذج العمل وتحضير الفريق للعرض.

والفائز بالمرتبة الأولى كان مشروع "جانا" وهو عبارة عن أداة لتعليم القراءة والكتابة باللغة العربية عن طريق الانترنت يستهدف الأطفال مستعينا بأفضل الطرق في تعليم اللغة العربية. وقد تألف الفريق من ريما الكردي ولويس لوبيز، وكلاهما مدرس في جامعة الملك عبدالله، وتسلما شيكا بمبلغ 112500 ريال سعودي (نقدا وعينا) قدمته مجموعة أرامكس.

وكانت المرتبة الثانية من نصيب المشروع "كالوريز" وهو عبارة عن قاعدة بيانات تغذية على الانترنت يوفر معلوما ت غذائية ثرة، بما في ذلك الأطعمة العربية التقليدية التي لا تتوفر في المنصة الحالية. وتكون فريق المشروع من وائل يار (من جامعة الملك عبدالعزيز) وأحمد الجبرين (من قسم تقنية المعلومات في جامعة الملك عبدالله) اللذين نالا مبلغ 50000 ريال سعودي برعاية مجموعة التركي.

ووضع الفريقان في القائمة القصيرة لبرنامج صندوق التمويل التأسيسي كأحد الفرق النهائية لفرصة للحصول على مائتي ألف دولار بهدف تحويل الفكرة إلى سلعة وخدمة تجارية. وضمت القائمة القصيرة أيضا كمتنافس نهائي لمنافسة صندوق التمويل التأسيسي والفائز بالمرتبة الثالثة مشروع "إس إم أيريا" وهو عبارة عن تقنية واقع افتراضي لعوامل الجذب الإسلامية في المدينتين المقدستين مكة المكرمة والمدينة المنورة. وتشكل الفريق من عبدالواحد الزائد ومحمد الزيدي ، وهما مشاركان من خارج جامعة الملك عبدالله.

أما أنس الدهلوي (من إدارة المشتريات في جامعة الملك عبدالله) وعضو فريق هاوي دوت كوم، وهو عبارة عن مشروع تواصل رياضي لردم فجوة التواصل بين الفرق والمرافق الرياضية، فقد حصد جائزة كلية بابسون تقديرا لعمله الجاد وتفانيه وما أحرزه من تحسن خلال الدورة الدراسية. وتتيح له الجائزة الالتحاق ببرنامج المشاريع المبتكرة الصيفي الذي تنظمه الكلية في العام 2013.

وبالإضافة إلى هذه الفرق الثلاثة الفائزة ، كان فريقان إضافيان هما "كيب إن تتش" و"سيرو" ضمن فرق القائمة القصيرة في منافسة عرب نت الرياض للعام 2012 التي نظمت في 20 و21 نوفمبر الماضي في مدينة الرياض وقد تنافست أفضل بدايات سباق الأفكار في المنطقة في سباق "عرب نت"، التي تعد أضخم منبر إعلامي رقمي ومنصة للأفكار المبتكرة في منطقة الشرق الأوسط وشمال أفريقيا.

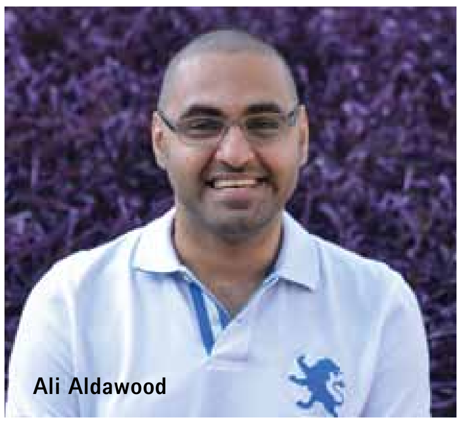
ومشروع "كيب إن تتش" هو برنامج لغة إشارة بالعربية للقضاء على الحواجز بين المصابين بإعاقة سمعية وعالم المتحدثين باللغة العربية. ويتكون الفريق من العضوتين لطيفة الصانع وريم التركي (من تقنية المعلومات في جامعة الملك عبدالله).

أما مشروع "سيرو" فهو عبارة عن برنامج تطبيقات للمسافرين إلى المدينتين المقدستين مكة المكرمة والمدينة المنورة ويسمح لهم بحجز الفنادق باستخدام الخرائط ثلاثية الأبعاد. ويتكون الفريق من الأعضاء أحمد الشويل (طالب دكتوراه من جامعة الملك عبدالله، قسم علوم وهندسة الحاسوب والكهرباء والرياضيات) وحمد تشيما (طالب ما بعد الدكتوراه في قسم العلوم والهندسة الفيزيائية في جامعة الملك عبدالله) وسعيد الأنصاري.

وتمخضت المنافسة عن فوز مشروع "كيب إن تتش" بجائزة المرتبة الأولى كما تم اختياره على أنه المشروع المختار من قبل الناس. ☐

ALUMNI SPOTLIGHT

May Alqurashi



Ali Aldawood

FEATURED here are two special alumni of the master's degree program – May Majed Attawati Alqurashi and Ali A. Aldawood, student speakers at the first and second KAUST Commencement, respectively. After receiving their degrees, both continued at the University for their PhD degrees, Alqurashi in Biological Engineering and Aldawood in Earth Sciences and Engineering. Alqurashi stays in touch with other members of her graduating class through the Alumni Website, Facebook, and Skype. "We shared so much here at KAUST. Even before we arrived on campus we became friends. In February 2009, a global meeting was held at the Hilton Hotel in Jeddah for members of the first class and professors. We even got a tour of the prospective campus. Of course, much of the future University was still sand, but we could picture what it was going to be."

Alqurashi, from Jeddah, says KAUST is a dream come true. "I have learned to be independent, to be able to take care of myself. I have broadened my horizons and learned to interact with people from other cultures. Sometimes a colleague will ask me a question about myself or my country, about something I have always taken for granted. It makes me stop and think and understand myself better." Alqurashi says she now has friends from all over the globe and runs into people from KAUST even in airports.

Currently, Alqurashi is working with Professor Chris Gehring studying phosphoproteomics, the study of protein activation by phosphates and how it affects proteins in a cell. Her project is focusing on the proteomic and phosphoproteomic analysis of a plant (*Arabidopsis thaliana*) treated with different concentrations of cyclic adenosine monophosphate (cAMP) at different time points. Her study will provide further insights into the biological effects of cAMP-dependent responses and link them to phosphorylation events at the systems level. It may also facilitate the discovery of novel proteins and phosphoproteins directly or indirectly responsive to cAMP.

Aldawood, from Qatif in the Eastern Province, began working for Saudi Aramco when he was 18. He spent one year in the college preparatory class concentrating on improving his English language skills before being sponsored to the University of Edinburgh for his BSc degree in Earth Sciences and Engineering. He returned to work at Saudi Aramco for two years in Exploration and Producing, one in the field and one in the office. Subsequently he was sponsored to KAUST to earn his MS degree again in Earth Sciences and Engineering. He received his degree December 2011.

Aldawood wasn't sure if he was going to continue his higher studies or go back to Saudi Aramco. However, Khalid Al-Faleh, CEO of Saudi Aramco, helped him decide. "He invited me to his office to talk about my plans and about KAUST. He encouraged me to think about continuing. I did and decided to return to KAUST for my PhD," Ali said. "I am so glad I did."

Last summer, Aldawood studied for a session at Stanford University. "Stanford is a top-tier school, but I thought that KAUST was comparable from both an intellectual standpoint and from what was demanded of me." He continued, "Studying for my PhD is a whole new experience. I have to be responsible, innovative, and solve problems. I can't replicate. I must be inventive." His research will focus on finding innovations for oil exploration and recovery.

Both Alqurashi and Aldawood encourage the new alumni to stay in touch with each other and with their mentors. "This network will be very important in coming years. So remember your adventures. Stay connected. Participate in alumni-focused programs. Learn where your classmates are going and what they are doing," they said.

Alumni will be helped to do this by using the new Alumni website (http://www.kaust.edu.sa/studentservices/alumni/alumni.html). Each alumnus has his or her personalized page and profile to keep up to date. Be sure to log on to keep abreast of the latest research and innovation at KAUST.

Each January during WEP there is a special series of lectures and workshops presented by alumni and a special Alumni Luncheon. Alumni from the region and in-Kingdom are invited to attend. It is an opportunity to interact with classmates, find out what each is doing, and make plans to stay in touch. This year's luncheon is slated for January 24. ☐

Winter Enrichment Program (WEP) 2013

THERE is much to be excited about in the upcoming Winter Enrichment Program (WEP) 2013, which begins January 12 and continues until January 30. There are over 15 keynote speakers and a myriad of learning opportunities in the form of workshops, classes, lectures, and activities.

Although the program is designed to enrich and broaden the knowledge base of KAUST students, WEP is also open to the entire community. Register now at http://wep.acadox.com/.

The overriding theme for this year's WEP is water, in acknowledgement of the United Nations International Year of Water Cooperation, and many activities are centered around this key focus. However, noteworthy speakers and their topics are varied and include environmental activist Philippe Cousteau Jr., grandson of the renowned marine conservationist Jacques Cousteau; veteran astronaut Claude Nicollier; popular Egyptologist Zahi Hawass; and Mars Rover scientist, Director of NASA's Jet Propulsion Laboratory, and KAUST International Advisory Council member Charles Elachi.

"I think everyone will find something that interests them," said WEP Chair, Prof. Susana Nunes.

WATER SYMPOSIUM JANUARY 12

THE 4th WEP will be launched with a symposium, organized by the University's Water Desalination and Reuse Center (WDRC), on sustainable water management and will bring together a number of international experts and industry leaders.

WDRC Director, Gary Amy, along with several other water technology specialists, will open the symposium with a morning session entitled "Urban Water Management in the City of the Future." The workshop will focus on sustainability, particularly as it relates to urban water management.

Referring to Masdar City as a model city of sustainability in the MENA region, Professor Amy remarked that policy issues go hand in hand with water management. "Water doesn't work in a vacuum, of course. It's connected with energy. Therefore, we are going to talk about the water/energy nexus. Within the context of Saudi Arabia, there's also a connection to food. So we're also going to be addressing the water/food nexus as well," he said.

Director of KAUST's Desert Agriculture Research Center, Nina Fedoroff, will take part in the afternoon session focusing primarily on the water-food-energy nexus. Professor Fedoroff will be joined, among others, by Gary White, CEO of Water.org – a non-profit organization founded by actor Matt Damon.

An industry CEO round table will conclude the program. It will be facilitated by Professor Jean Frechet, KAUST Vice President of Research. Two thirds of the roundtable will be Saudi stakeholders, including Saudi Aramco executive Osama Faqeeha, head of the Corporate Environmental Protection Department.

Other Water Related Events

JANNUARY 11: CONCERT

The KAUST Community Orchestra will perform several movements from Handel's Water Music and a selection of other classical water-themed delights.

JANUARY 13: WATER THEME IN ART HISTORY

Artist Anne Vignal will discuss how artists have captured the elusive elements of liquid and water to make their visual experiments extremely diverse through light, reflections, illusionistic representation, and symbolism.

JANUARY 14-17: HANDS-ON PAINTING WORKSHOP ON THE THEME OF WATER

Learn the practice and techniques of using oil paint and/or watercolors with Anne Vignal. Participants will paint images from nature (by the sea) or from pictures.

JANUARY 19: KEYNOTE LECTURE – "OUR OCEANS, OURSELVES"

Philippe Cousteau Jr. is the President and Co-Founder of EarthEcho International, a non-profit organization with a goal to engage and empower youth to take action for a brighter future. His multimedia presentation will be told through stories of the oceans and how we can share the adventure of preserving them.

2013 KEYNOTE LECTURERS

Janet Echelman – American artist

Michael Grätzel – Professor at the École Polytechnique Fédérale de Lausanne, where he directs the Laboratory of Photonics and Interfaces

Spencer Wells – an Explorer-in-Residence at the National Geographic Society, and Frank H. T. Rhodes class of '56 Professor at Cornell University. He leads The Genographic Project.

Philip Rosendale – Founder and Chairman of Second Life / Co-founder of Coffee & Power

Sami Nawar – Director of Jeddah Historical Municipal Branch

Philippe Cousteau Jr. – President and Co-Founder of EarthEcho International

Claude Nicollier – European Space Agency (ESA) astronaut, and a veteran of four space flights

Ismail Serageldin – The Director of the new Library of Alexandria

Charles Elachi – Director of NASA's Jet Propulsion Laboratory, Vice President of the California Institute of Technology, and KAUST IAC member. Dr. Elachi oversees the Mars Rovers.

Che Ting Chan – a Chair Professor of Physics at Hong Kong University of Science and Technology (HKUST), the Director of William Mong Institute of Nano Science and Technology, and the Executive Director of HKUST Institute for Advanced Study

Pierre Magistretti – Dean of Biological and Environmental Sciences and Engineering Division at KAUST

Francois Ansermet – Academic Director of the University Department of Psychiatry, Faculty of Medicine, University of Geneva

Bernard Bigot – Head of the French Nuclear Energy Agency

James Mori – Seismologist, Kyoto University, Earthquake Hazards Division

Zahi Hawass – Egyptian archeologist, has served as the Secretary General of the Supreme Council of Antiquities and Director of Excavations at Giza, Saqqara, and the Bahariya Oasis.

Henry Tye – Horace White Professor of Physics at Cornell University, a fellow of the American Physical Society, and the director of the Institute for Advanced Study at HKUST

IN-KINGDOM SPEAKERS AND INSTRUCTORS

BUSINESS LEADERS SERIES

ENG. RAMI ABU GHAZALEH – CEO and a co-owner of AlBaik Food Systems Company. Eng. Rami Abu Ghazaleh is a businessman who manages more than 30 AlBaik fast-food restaurant operations in Jeddah, Makkah, Madinah, and Yanbu.

ENG. MOHAMED ALAGIL – CEO of Jarir Investment, Chairman of the Board of Directors, Jarir Group Companies. Jarir Marketing Co (JMC) is a local success story and a great example of a successful family business.

MRS. NASHWA ABDULHADI HASSAN TAHER – Board Member, Aal Taher Group. Mrs. Taher is one of the most successful Saudi businesswomen today. She is one of the first women to be elected onto the Board of Directors of the Jeddah Chamber of Commerce and Industry (JCCI).

LECTURES, COURSES, AND WORKSHOPS

Modern Drilling Techniques in the Oil & Gas Industry – A course by Abass Hazim (Petroleum Engineering Consultant, Saudi Aramco) and Batarseh Sameeh (Researcher, Saudi Aramco)

Molecular Modeling and Computer-Aided Drug Design (CADD) – A workshop By Alghamdi Miasser (System Analyst, SABIC), Morar Mariya (Research Scientist, SABIC), and Xavier Prince (Research Scientist, SABIC)

Ma'aden Gold Mine – A lecture by M. Al Shangiti Yahia (President, Ma'aden Gold & Base Metals Co.)

Modern Drilling Techniques in the Oil & Gas Industry – A course with Kayal Aymen (Professor, Assistant Dean, CIM, KFUPM)

SABIC Lecture on Computational Chemistry, Cheminformatics and Chemogenomics Approaches in Modern Drug Discovery – A lecture by Xavier Prince (Research Scientist, SABIC)

Legacy of Historical Jeddah – A lecture and course by Nawar Sami (General Director of Culture and Tourism, Jeddah Municipality)

FIELD TRIPS

A Tour of Historical Jeddah: Tour the Old City of Jeddah. The tour is organized by Sami Nawar, the Director of Jeddah Historical Municipal Branch.

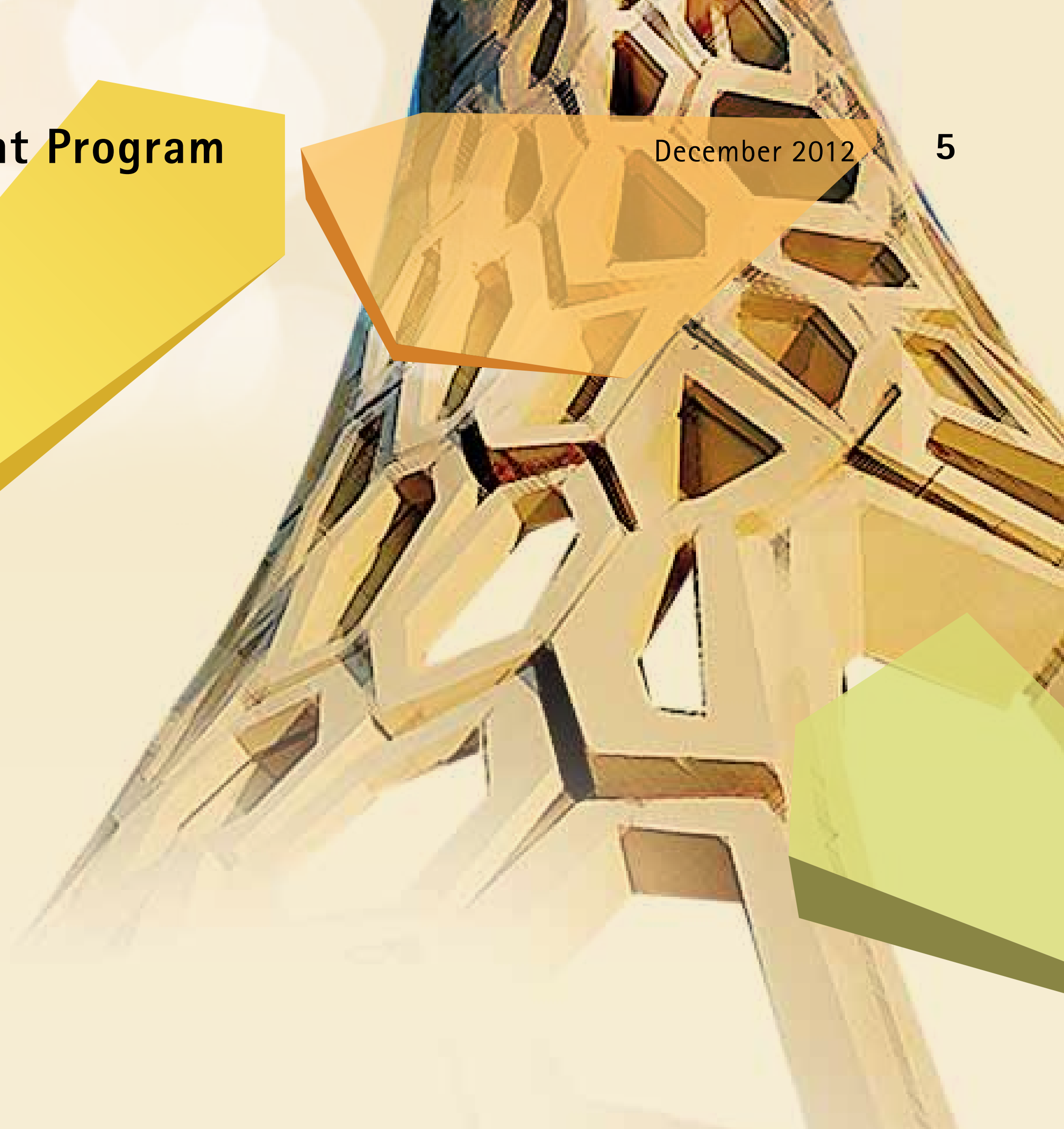
Lava Caves in Saudi Arabia: This one-day field trip explores one of Saudi Arabia's lava caves. The trip is open to a limited number of participants.

Observational Astronomy Course - Stargazing in the Arabian Desert: This short informal course is aimed at beginners who want to know more about the wonders of the night sky. The course is divided into classroom sessions and an observation trip to the desert.

Saudi Arabia's Largest Earthquake: This three-day field trip is to the Gulf of Aqaba region. The trip is open to a limited number of participants.

Discover Reef Check: Experience marine biology and coral reef monitoring close at hand. The course includes a classroom theory session, and either a snorkeling trip or a diving trip.

Visit to Petro Rabigh: Petro Rabigh is a competitive and innovative petrochemical company located on a 3,000 acre site north of KAUST.



POSTER COMPETITIONS

WEP research poster competitions are an ideal opportunity for students and postdocs to share the results of their hard work, and present their research to WEP visitors and colleagues from KAUST. Competition entries are judged on quality, completeness, and impact of the work, as well as on the visual clarity of the presentation.

The finalists (50 from each category) will present their posters at the University Library. *The Second Annual International Research Poster Competition for Undergraduates* will present their work on January 20, and the *KAUST Graduate Student and Postdoc Poster Competition* on January 21. All award ceremonies will be on January 23.

Note: The KAUST Graduate Student and Postdoc Poster Competition deadline is December 15. For more information, please contact: *kaustpostersession@kaust.edu.sa*

JANUARY 27: SCIENCE FUN FAIR and DR. BUNHEAD'S CRASH TEST SCIENCE SHOW

Dr. Bunhead is back for WEP 2013! TV's most extreme TV scientist (from Brainiac) comes to Saudi Arabia to deliver 100% pure, live, high-octane explosive science!

CULTURAL AND RECREATIONAL EVENTS

WEP enriches and inspires with events and projects that go beyond the traditional academic curriculum. In addition to the weekday courses, workshops, and lectures, WEP offers various cultural and recreational events at weekends. Some of the noteworthy events include Arabic classes, guitar classes, painting and decoupage workshops, improvisation workshops, and a poetry and heritage night.

GET INVOLVED AS A VOLUNTEER!

WEP relies on volunteers to help make the program a success. Volunteers will have the opportunity to be involved in various activities, such as informing and guiding WEP visitors and covering events with Tweets, Facebook updates, photographs, and science reports. To find out more, please email *bakhta.ouali@kaust.edu.sa*

Attendees at the SAHPC 2012 conference during opening day's keynote sessions.

SAHPC 2012 CONFERENCE: SUPERCOMPUTING FOR A SUSTAINABLE FUTURE

THE UNIVERSITY recently hosted a three-day conference focusing on supercomputing. A premiere regional event in its third edition, the Saudi Arabian High Performance Computing (SAHPC) forum took place from December 1 to 3. The event, consisting of two days of plenary sessions followed by a day of tutorials, brought together an international array of industry leaders, application developers, educators, as well as scientific and engineering users.

Approximately 300 registered participants were joined by additional walk-ins from KAUST. Seven Saudi universities sent representatives, and these were joined by seven universities from abroad. Seventeen computer vendors sent a total of 53 representatives, many of whom gave technical talks on their latest offerings. KAUST's Student Chapter of the ACM staffed the meeting, which was organized by representatives of KAUST's Center for Extreme Computing, the KAUST Supercomputing Laboratory, and KAUST Information Technology.

Addressing the audience during opening remarks, Prof. David Keyes, Dean of KAUST's Computer, Electrical, and Mathematical Sciences and Engineering Division, explained how "the goal of SAHPC is to create national critical mass out of separate institutions." The networking opportunities provided by SAHPC foster new collaborations between HPC (high performance computing) communities in the Kingdom. Such interactions were also facilitated by break and lunch sessions sponsored by KAUST's Office of Competitive Research Funds and industry vendors (IBM, Dell, HP, Intel, NVIDIA, and others), and a technical poster competition.

Topics covered at SAHPC 2012 included: large-scale data analytics, large-scale simulation, and computational science and engineering, as well as discussions on several themes surrounding emerging architecture such as processing, storage, system software, and programming models.

High Performance Computing and its Impact on the Kingdom

As Keyes also emphasized, SAHPC aims to "project a national identity for high-performance computing in the Kingdom of Saudi Arabia as an emerging international player in supercomputing." It is of particular significance that another Saudi super computer, in addition to KAUST's own Shaheen, came into the top 500 at Supercomputing 12, an international conference for high performance computing which took place last month in Salt Lake City, Utah. Named SANAM, and hosted at KACST, it has ranked second in the worldwide list of the most energy-efficient computers.

A crucial role played by high performance computing is simulation of natural or human-engineered systems. Prof. Keyes described that aspect of HPC:

"Simulation is like a time machine that can explore the behavior of systems before they're built and focus the always necessary experimental program to that narrow region of parameter space, which is expected to be most productive to guide engineering design. It serves to inform decision makers, to make civil infrastructure smarter and more sustainable by integrating data and analytics, to enable an innovative workforce, and to attract investment from companies and from outside."

Such initiatives are of primary concern to the Kingdom and the world because they have the potential, as has happened many times in the past two decades, of creating previously unimagined jobs. Scientists and engineers inevitably find new ways of utilizing fast-developing HPC resources. The cost for computing in dollars, per installed gigaflops on real applications, has been improving on an exponential curve – in essence, "dropping by a factor of a thousand every ten years for more than two decades" according to Keyes.

These HPC advances have led scientists and engineers to create predictive simulations to produce rigorous data sets and software that are now enabling other scientists and engineers to quantify real-world sustainability-focused initiatives.

Developing Smart and Sustainable Cities of the Future through HPC

Speaking at SAHPC 2012 about such sustainable energy-oriented, data-intensive, and solution-intensive applications was Steve Ashby, Director for Science and Technology at Pacific Northwest National Lab (PNNL) of the US Department of Energy. Showing pictures of the darkened skylines of San Diego, California, and New York City, he illustrated the massive power outages characterized by the 2011 great blackout of the Southwest and the Northeast blackout of 2003, which he claimed would be preventable by sensor and simulation technologies being put in place today in a pilot program headed by PNNL and based on massive data analytics and simulation.

"We flip a switch, and we expect there to be light in our homes or offices. You take it for granted until it doesn't happen. We expect the power grid to handle dynamic loads, and we will shortly expect it to utilize more dynamic sources. We also expect elements on a smart power grid, such as batteries in electric cars, to be employed as storage devices."

Dr. Ashby's talk focused on how supercomputing can be used to usher in a new, more sustainable, and smart grid for the future as renewable sources of energy such as solar, wind, and geothermal are increasingly being investigated here in the Kingdom. Increasing requirements are placed upon the power grid to deliver energy to homes and businesses. In response, HPC scientists are developing two-way dynamic responsive loads. The idea consists of using specially designed chips in common appliances and automobiles that can interact with the power grid system through electrical outlets or smart meters.

"Smart chips embedded in your washer and dryer can communicate through a smart meter on your home with the electric grid. They will look to see if the grid is being stressed in a particular moment; maybe it will delay starting the wash cycle or maybe just turn off the compressor in an air conditioner. It will also allow you to negotiate pricing. You may say: Wash the dishes or the clothes when the price per kilowatt per hour drops to a certain level; delay it otherwise. But I've got a dinner party, so whatever you do make sure the dishes get washed no later than a certain time. This type of optimization requires system-wide communication and processing of PetaBytes of data."

Besides Dr. Ashby, keynote speakers from abroad included Jack Dongarra of Oak Ridge National Laboratory, the keeper of the dynamically ranked "Top 500" list of the world's supercomputers; Thomas Zacharia, the Vice President for Research of the Qatar Foundation, and an influential promoter of HPC during his two decades of service in the US Department of Energy; and James Sexton, the Computational Sciences Center leader at IBM Research in New York. Representatives from vendors included Dr. Shinjo Naoki, who designed the computer ranked #1 in the world in 2011, the Japanese "K machine", and Leijun Hu, who designed the computer ranked #1 in 2010, the Chinese "Tianhe-1A". Other speakers, besides vendors, came from SABIC, Saudi Aramco, KACST, and KFUPM.

Seventeen posters were submitted, with Best Poster Prizes going to Kiran Narayanan, a PhD candidate in Mechanical Engineering at KAUST, Raeece Naeem, a Research Engineer at CBRC, and Dr. Muhamed Mudawer, a Professor of Computer Engineering at KFUPM.

By providing such an annual forum, SAHPC serves, as claimed in the conference's program, to "enable scientific, economic, and social advances through the development and implementation of computing and data-intensive solutions." ☐

STRATEGIC INITIATIVE IN EXTREME COMPUTING (SIEC):

ALGORITHMS AND APPLICATIONS FOR EMERGING ARCHITECTURES

THE Strategic Initiative in Extreme Computing (SIEC) under the direction of Professor David Keyes is one of three new initiatives in the Division of Computer, Electrical, and Mathematical Science and Engineering (CEMSE). The others are in the Numerical Simulation of Porous Media (focusing on such media as petroleum reservoirs, membranes, and solid-state fuel cells), headed by Professor Victor Calo, and Uncertainty Quantification led by Professor Raul Tempone. In miniaturizing, designers are optimizing three parameters: computation time, functionality, and battery life. This involves tradeoffs. Particularly, increased functionality penalizes battery life. But transistor architecture is now reaching a limit where it is increasingly more difficult to squeeze out any faster computation, more functionality or longer battery life. Researchers are thus looking for different and better transistor designs.

SIEC aims to place innovative and accessible high-end simulation tools into the hands of users from the sciences and engineering – in diverse subjects that include environmental modeling, combustion, and neuroscience, for example. “While many mathematicians and computer scientists prefer to emphasize their fields as sciences in their own right, I am happiest to be regarded as an enabler,” Prof. Keyes told The Beacon in a recent interview. “Our aim is to work with researchers in other disciplines to make simulation and the exploitation of large datasets both computationally efficient and scientifically effective.”

The scientific method requires the formulation, testing, and refinement of hypotheses and demands reproducibility and the quantification of uncertainty. Alongside theoretical and experimental approaches, computer simulations play a burgeoning role. In simulation, the world is modeled by laws expressed in mathematics; partial differential equations (PDEs) are one such group of models that can be used to describe natural phenomena in quantitative terms. KAUST has many experts in PDEs on its faculty, and they create a link between engineering applications and computer software.

Following six extraordinary decades of algorithmic and hardware development, with nearly a factor of one thousand more computational power available every decade, Prof. Keyes believes that high performance computing currently stands at a crossroads not witnessed since the mid-1980s, because of many new disruptive technologies. This drives the research agenda of the SIEC. Prof. Keyes, who tells the Beacon he is “one of the relatively few ‘old people’ in the business,” reminds us that, since 1988, simulation capability has improved by more than a factor of a million in performance (from Gigaflop/s to many Petaflop/s) and by nearly a factor of a million in price/performance (from over $2.5M per delivered Gigaflop/s to approximately $5 per Gigaflop/s). However, this increased performance has thrown computers out of balance, relative to the design of optimal algorithms, which have always assumed that data communication was cheap and operating on data was expensive. After decades of exponential growth in operation efficiency that outpaces the exponential growth in communication efficiency, the world of algorithms has been turned nearly upside down.

KAUST researchers have access to a coveted combination of supercomputing equipment including IBM’s new BlueGene Q, Intel’s new Xeon Phi manycore processors, NVIDIA’s new Kepler GPUs, and the new AMD-based machine SANAM at KACST, and SIEC at KAUST is poised to take up the resulting algorithmic challenges. There are multiscale, multirate scientific and engineering applications in the KAUST’s research portfolio of energy, environment, food, and water that possess resolution requirements that are practically inexhaustible. These demand execution on the highest-capability computers available in order to maintain competitive advantage. “To outcompute is to outcompete,” reminds Keyes, quoting the CEO of Silicon Graphics. It is ready access to such a computational environment that was a factor in the successful recruitment of many of our current faculty to the University.

Professor Keyes eagerly awaits the arrival of the new CEMSE dean, as this will allow him to devote his time and energy to SIEC. Common hardware and software infrastructure draws researchers together from many application areas and encourages transdisciplinarity. “I see our facilities and the SIEC as a watering hole for thirsty scientists,” he comments. ☐

KAUST RECEIVES CUDA RESEARCH CENTER STATUS

GLOBAL technology company NVIDIA has acknowledged KAUST’s position in the forefront of designing and implementing algorithms for emerging computer architectures, and awarded KAUST a *CUDA Research Center* status.

NVIDIA is best known for its graphics processing units (GPUs) and for providing parallel processing capabilities that allow supercomputing sites to run high-performance applications.

The company fosters collaboration with universities and research institutes by way of several academic research programs. Institutions identified as CUDA Research Centers are doing world-changing research in a particular domain or field by leveraging CUDA and NVIDIA GPUs. GPUs, which originated as specialty hardware for real-time applications such as interactive gaming, are now employed in 62 of the world’s top 500 supercomputers, including the computer ranked #1 in the entire world and the new KACST computer (“SANAM”) ranked #1 in Saudi Arabia, which is #52 in the world rankings.

KAUST will benefit from this recognition in several ways. It has already installed several Kepler GPUs from NVIDIA, which KAUST received as a gift from the company (worth about $70K). NVIDIA will provide KAUST with tailored training sessions. As researchers thrive on being first, one of the main benefits will be an early access to the company’s future hardware and software. ☐

KAUST exhibit at the Supercomputing '12 conference, Salt Lake City.
Photo by Huda Ibeid

Children from The KAUST Schools (TKS) recently treated their families and friends to a performance of "Granny Annie," written and directed by John McHugh, TKS Drama/Theater Arts Teacher. Young musicians featured in the photo are (left to right): Jasmine Devani, Sofia Valenzuela (back), Clarisse Aubry, Mallory Hermanson, Lina Ghaffour, and India Lehvaslaiho. Photo: Eric Bakken

MY UNIVERSITY

AREF BISHBISHI

AREF was born and raised in Makkah. He received his security training at Saudi Aramco, where he worked for 21 years before joining KAUST in June 2009.

In the security field, Aref Bishbishi has close to twenty years of experience in a specialist division that consist of dog handlers and their canine partners. Dogs are often faster and stronger than most humans, and they have a superior sense of smell. Highly skilled K-9 dog handlers can utilize these traits and employ dogs to work in various specific security and law-enforcement tasks, such as detecting harmful substances.

Aref was the first K-9 expert to join KAUST's K-9 Unit, and is the Unit's Supervisor. "We keep on top of the changes in KAUST campus and the community," Aref says. "We started with ten dogs but the Unit has expanded with KAUST."

Aref keeps the Unit operational at all times. "Dogs join us fully trained, but we reinforce and increase their skills," Aref says. "We train them in the Unit compound and in various locations around the campus. I make sure that the dogs and the search technicians are familiar with all locations within KAUST."

Most of the Unit's work is conducted behind the scenes. Community members may get a chance to see Aref and his dog/handler teams during regular KAUST gate searches, or they can meet them at K-9 displays during community events. ☐

DANIEL BINHAM

PHD STUDENT Daniel Binham was born in Washington, DC, US, and raised in Austria, Finland, and Belgium. He graduated from the University of Cambridge, UK, before joining KAUST in 2010. Daniel's PhD is on shortest pairwise-intersecting paths, a mathematical problem that combines the fields of geometry and graph theory. He studies in the Geometric Modeling and Scientific Visualization Center, under the supervision of Professor Antoine Vigneron.

Daniel was attracted to KAUST by the possibilities the University offered, but also by a vision of a new community he could take part in building. He is an active member of the Green Group, a member of the Community Chorus, and a table tennis champion. Daniel is also President of KAUST's Theater Troupe, which produces plays throughout the year.

"The vision I had was of a start-up with great facilities and near-limitless resources, but short of people taking advantage of them," Daniel said. "For instance, when I found out that KAUST lacked a theatrical scene, I immediately dreamed of creating one; thanks to the enthusiasm of fellow students and community members (plus generous support from Graduate Services, the Office of the Arts, Recreation, and many others), this dream came true." ☐

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2011–2012 KAUST ANNUAL REVIEW

THE University's first Annual Review, "Sharing the Dream, Excellence with Purpose" is available to all faculty, students, postdocs, researchers, and staff. Students may pick up their copy at the iHub in the Student Center. Copies will be distributed to faculty, researchers, postdocs and staff through their Deans, Research Centers, Vice Presidents, or Managers' offices or through the Communications Department.

The 78-page document describes the direction and life of the University from July 1, 2011-June 30, 2012. It is divided into five sections – Education, Research, Economic and Technology Development, Our People and Community, and Governance and Leadership, and is full of facts, figures, photos, student profiles, and information that explain the workings of the University during this time period. Be sure to pick up your copy. ☐

KATTERBAUER WINS PHD DIVISION IN SPE STUDENT PAPER CONTEST

THE Saudi Arabian and Bahrain Sub-regional Society of Petroleum Engineers (SPE) Student Paper Contest was held at KAUST on November 15. The contest was organized by Ahmad Kadoura, Klemens Katterbauer, Ardiansyah Negara, and Rebecca Allen from the SPE-KAUST Student Chapter.

The BSc, MSc, and PhD division winners were Mohammed Al-Kuhlani, King Fahd University of Petroleum and Minerals (KFUPM); Ziad Zaffer Jangda, KFUPM; and Klemens Katterbauer, KAUST, respectively.

The winners qualified to compete in the Middle East Regional SPE Student Paper Contest, to be held on April 15, 2013, in Cairo, Egypt. ☐

عودة يحصد الجائزة الثانية في الأولمبياد الدولي للالكترونيات الدقيقة

حصل طالب الدكتوراه في الهندسة الكهربائية محمد عودة المركز الثاني في الأولمبياد الدولي السنوي السابع للالكترونيات الدقيقة والذي عقد في أرمينيا في بداية شهر أكتوبر الماضي. وقد عكست هذه المنافسة التنوع في المهندسين الموهوبين من الفئة الشابة والبالغ عددهم 418 من 14 دولة. وقد تناقلت أخبار هذا الحدث وسائل إعلامية دولية مثل سي إن بي سي وفوكس نيوز وستوك ووتش ونشرة أخبار بي آر.

وكان عودة قد حصل على بكالوريوس وماجستير العلوم من جامعة عين شمس في مصر. ويناقش بحثه الذي يعده لنيل درجة الدكتوراه ويشرف عليه البروفيسور خالد سلامة تطوير " On-Chip RF Energy Harvesting modules„ لتزويد أجهزة الإحساس بالطاقة من إشارات آر إف الواردة. كما حصل عودة على المرتبة الثانية في المنافسة التي نظمتها جامعة الملك عبدالله للعلوم والتقنية. ☐

OUDA WINS SECOND PLACE AT THE ANNUAL INTERNATIONAL MICROELECTRONICS OLYMPIAD

MAHMOUD Ouda, Electrical Engineering PhD student, has come second at the Annual International Microelectronics Olympiad that took place in Armenia. The competition reflected the diversity of the 418 competitors representing 14 countries. The event gained wide media attention and was featured by CNBC, Fox News, Stock Watch, and PR Newswire.

Ouda gained his BSc and MSc from Ain Shams University, Egypt. His PhD research, which is supervised by Professor Khaled Salama, is on developing On-Chip RF Energy Harvesting modules to deliver power to wireless sensors from incoming RF signals. This module provides a platform for wireless miniaturized sensors that work without a battery, and can be implanted inside human body to monitor physical properties such as pressure and temperature. The work can lead to further application in asset management, goods tracking in supply chain, contactless smart cards, and wireless sensors in smart buildings and home automation. ☐